

SAMPLE-SIZE EFFECTS IN  
FAST-NEUTRON GAMMA-RAY  
PRODUCTION MEASUREMENTS:  
SOLID-CYLINDER SAMPLES\*

by

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ABSTRACT

The effects of geometry, absorption and multiple scattering in  $(n, X\gamma)$  reaction measurements with solid-cylinder samples are investigated. Both analytical and Monte-Carlo methods are employed in the analysis. Geometric effects are shown to be relatively insignificant except in definition of the scattering angles. However, absorption and multiple-scattering effects are quite important; accurate microscopic differential cross sections can be extracted from experimental data only after a careful determination of corrections for these processes. The results of measurements performed using several natural iron samples (covering a wide range of sizes) confirm validity of the correction procedures described herein. It is concluded that these procedures are reliable whenever sufficiently accurate neutron and photon cross section and angular distribution information is available for the analysis.

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